

EGU2020-15854, updated on 19 Sep 2020
<https://doi.org/10.5194/egusphere-egu2020-15854>
EGU General Assembly 2020
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On the features of the dynamics of the upper mixed layer of the ocean in the presence of shear flows

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In the framework of the modernized RANS model of turbulent closure [1], the evolution in the pycnocline and shear flow in the upper mixed layer of the ocean is studied. For this purpose, one of the variants of the model situation is considered, which consists in studying the mutual transformation of the buoyancy frequency, shear flow, as well as the kinetic and potential turbulence energies determined at the initial time at different depths. It is shown that the kinetic energy of turbulence increases with time, and its maximum shifts to the maximum of the horizontal shear flow. However, unlike the standard gradient scheme, in the beginning there is a mutual transformation of the kinetic and potential turbulence energies, after which they quickly reach a stationary equilibrium level (at large values of the Richardson numbers). A significant change in stratification, initially having a maximum at a certain depth, was also found in the process of establishing a stationary turbulence regime.

The work was financially supported by the Russian Foundation for Basic Research (projects № 18-05-00292, 18-35-00602).

References:

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How to cite: Soustova, I., Gladskikh, D., Troitskaya, Y., and Ostrovsky, L.: On the features of the dynamics of the upper mixed layer of the ocean in the presence of shear flows, EGU General Assembly 2020, Online, 4–8 May 2020, EGU2020-15854, <https://doi.org/10.5194/egusphere-egu2020-15854>, 2020